REPORT

GORE PARK RESIDENCES

HAMILTON, ONTARIO

PEDESTRIAN WIND COMFORT ASSESSMENT

PROJECT #2602567
July 8, 2026

SUBMITTED TO

Ninco Developments
c/o Daniel Bragagnolo
18 Short Road Unit 5
Dundas, Ontario L9H 5L7

SUBMITTED BY

Maria Loaiza Osorio, M.A.Sc.
Technical Coordinator
Maria.LoaizaOsorio@rwdi.com

Rose Babaei, Ph.D.
Senior Scientist Engineer
Rose.Babaei@rwdi.com

Farah Ajeena, M.Sc., P.Eng.
Project Manager
Farah.Ajeena@rwdi.com

RWDI
600 Southgate Drive
Guelph, ON N1G 4P6
T: 519.823.1311

rwdi.com

1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained to conduct a pedestrian wind assessment for the proposed Gore Park Residences development in Hamilton, Ontario. The objective of this assessment is to provide an evaluation of the potential wind impact of the proposed development in support of an upcoming Site Plan Approval (SPA) application.

The project site is located north of Main Street East, between James Street South to the west and Hughson Street South to the east. The site is primarily surrounded by mid- to high-rise buildings in downtown Hamilton (Image 1).

The proposed development is Phase 1 of a multi-phase project. It consists of a 12-storey L-shaped residential building with a 5-storey podium, at an approximate height of 44 meters (Image 2). In addition to sidewalks and properties near the project site, key areas of interest for this assessment include the main entrances to the building, as well as the exterior amenity area on Level 6 (Image 3).

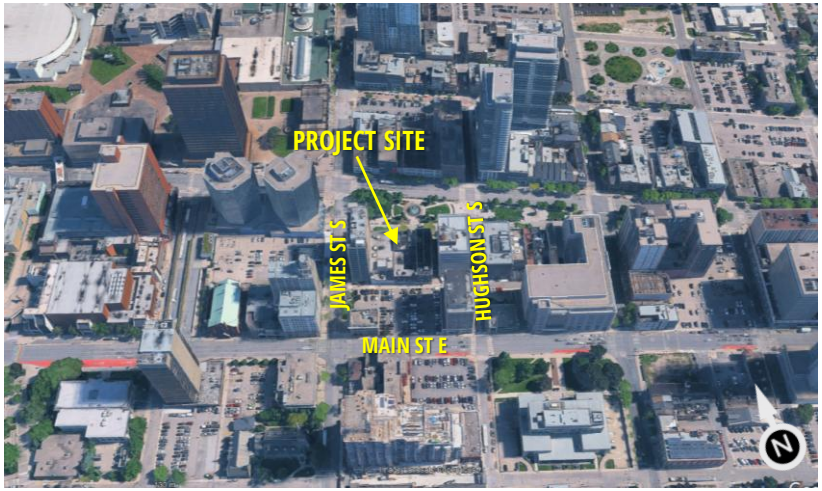
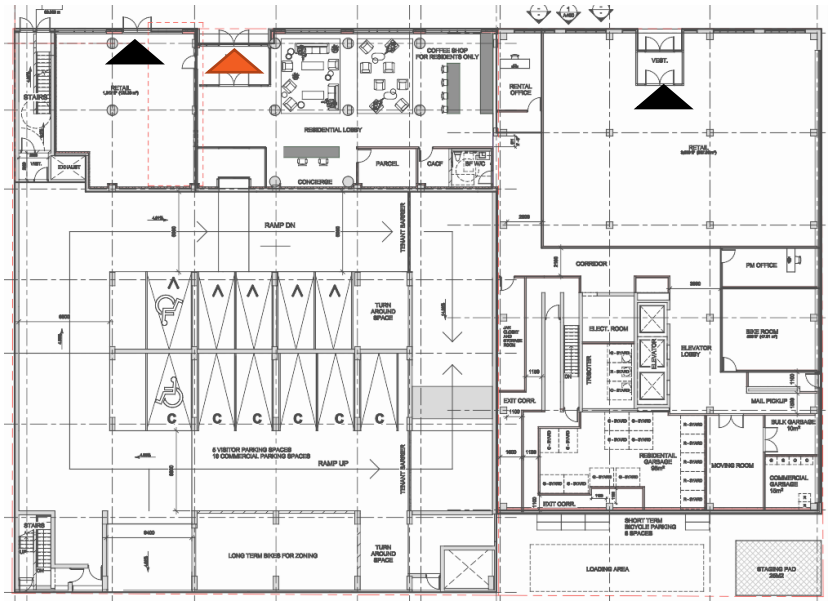


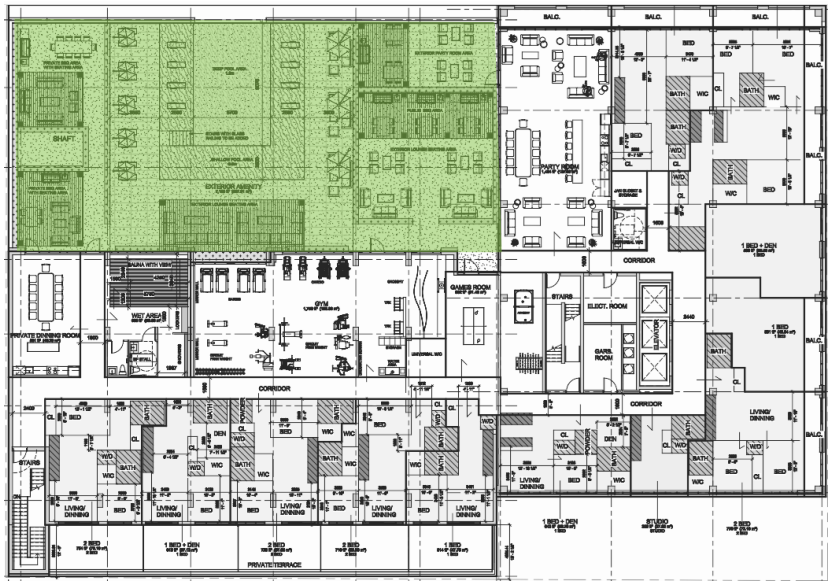
Image 1: Aerial view of the existing site and surroundings
Source: Google Maps

Image 2: Conceptual massing of the proposed development

1. INTRODUCTION



1ST Floor Plan



6th Floor Plan

RESIDENTIAL ENTRANCE RETAIL ENTRANCE OUTDOOR AMENITY

Image 3: Development floor plans identifying key outdoor areas of interest

2. METHODOLOGY

2.1 Objective

The objective of this assessment is to provide an evaluation of the potential impact of the proposed development on wind conditions in pedestrian areas on and around it based on Computational Fluid Dynamics (CFD) modelling. The assessment is based on the following:

- A review of the regional long-term meteorological data from John C. Munro Hamilton International Airport;
- 3D model and floorplans of the proposed project received on June 15, 2026;
- The use of *Orbital Stack*, an in-house CFD tool;
- RWDI's engineering judgment, experience, and expert knowledge of wind flows around buildings[1-3]; and,
- The RWDI pedestrian wind comfort and safety criteria, which are adopted by the City of Hamilton.

Note that other microclimate issues such as those relating to cladding and structural wind loads, door operability, air quality, snow impact, etc. are not part of the scope of this assessment.

2.2 CFD for Wind Simulation

CFD is a numerical technique that can be used for simulating wind flows in complex environments. For this analysis, CFD techniques were used to generate a virtual wind tunnel where flows around the site and its surroundings were simulated in full scale. The computational domain that covered the site and its surroundings was divided into millions of small cells where calculations were performed, yielding a prediction of wind conditions across the entire study domain. CFD excels as a tool for wind modelling, presenting early design advice, comparing different design and site scenarios, resolving complex flow physics, and helping diagnose problematic wind conditions.

While the computational modelling method used in the current assessment does not explicitly simulate the transient behaviour of turbulent wind, its effects were estimated based on other calculated quantities. RWDI has found this approach to be appropriate for the assessment of typical wind comfort conditions. Wind safety issues, which relate to transient, higher-speed gusts, are discussed qualitatively, based on the CFD predictions and our extensive wind-tunnel experience for similar projects.

In order to quantify the transient behaviour of wind and refine any conceptual mitigation measures, a more detailed assessment would be required using either boundary-layer wind tunnel or transient computational modelling.

2. METHODOLOGY

2.3 Simulation Model

CFD simulations were completed for two scenarios:

- Existing: Existing site and surroundings, and
- Proposed: Proposed development with the existing surroundings.

The computer models of the proposed building is shown in Image 4, and the Existing and Proposed scenarios with the proximity model are shown in Images 5 and 6, respectively. The 3D models were simplified to include only the necessary building and terrain details that would affect the local wind flows in the area and around the site. Landscaping and other smaller architectural and accessory features were not included in the computer model in order to provide more conservative wind conditions (as is the norm for this level of assessment).

The wind approaching the modelled area were simulated for 16 directions (starting at 0°, at 22.5° increments around the compass), accounting for the effects of the atmospheric boundary layer and terrain impacts. Wind data were obtained in the form of ratios of wind speeds at approximately 1.5m above concerned levels, to the mean wind speed at a reference height. The data was then combined with meteorological records obtained from John C. Munro Hamilton International Airport to determine the wind speeds and frequencies in the simulated areas.

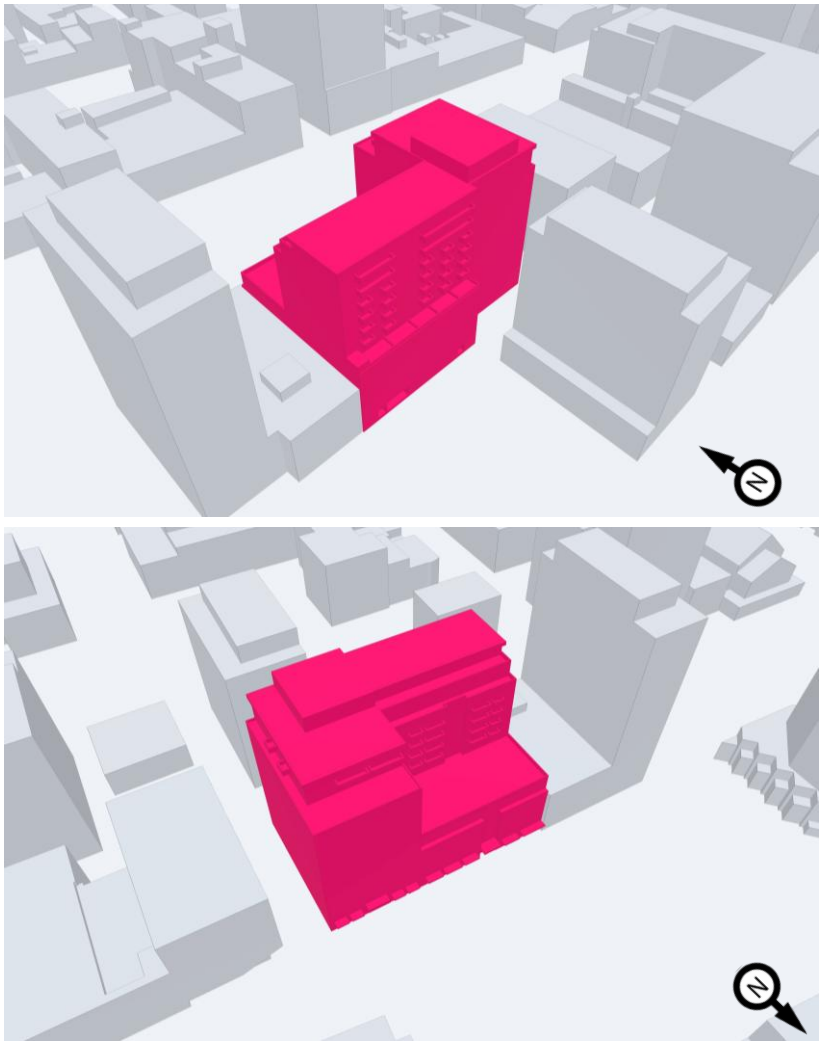


Image 4: Computer model of the proposed development

2. METHODOLOGY

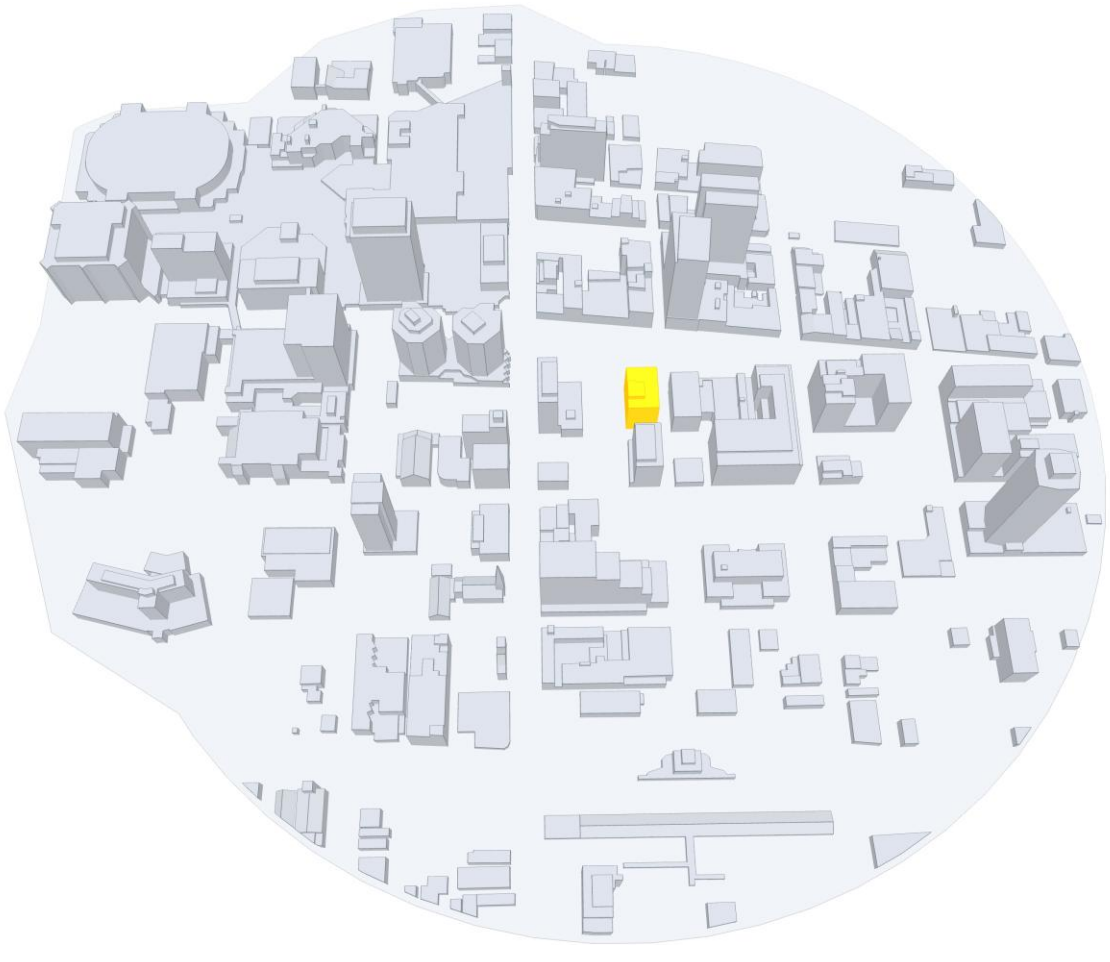


Image 5: Computer model of the existing site and extended surroundings

2. METHODOLOGY

Image 6: Computer model of the proposed development with existing surroundings

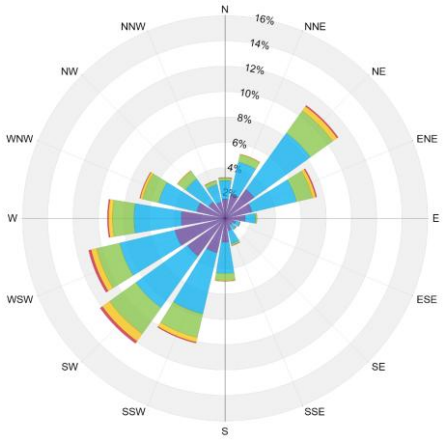
2. METHODOLOGY

Long-term wind data recorded at John C. Munro Hamilton International Airport between 1994 and 2024, inclusive, were analyzed for the summer (May to October) and winter (November to April) months. Image 7 graphically depicts the directional distributions of wind frequencies and speeds for these periods.

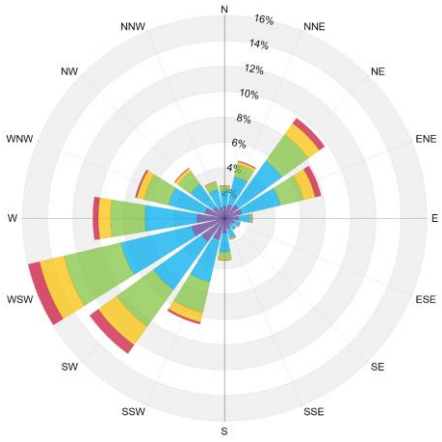
When all directions are considered, winds from the northeast and southwest are predominant in the both the summer and winter, as indicated by the wind roses.

Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10m) are more frequent in the winter (red and yellow bands in Image 7). These winds potentially could be the source of uncomfortable or severe wind conditions, depending on the site exposure and development design.

Wind statistics were combined with the simulated data to predict the wind conditions at the project site and assessed against the wind criteria for pedestrian comfort.



Summer
(May through October)



Winter
(November through April)

Wind Speed (km/h)	Probability (%) Summer	Winter
Calm	3.3	2.0
1-10	35.2	22.4
11-20	42.7	39.4
21-30	15.4	24.3
31-40	2.8	8.7
>40	0.7	3.3

Image 7: Directional distribution of wind approaching John C. Munro Hamilton International Airport (1994 to 2024)

3. WIND CRITERIA

The RWDI pedestrian wind criteria are used in the current study; the criteria presented in the table below, addresses pedestrian safety and comfort. These criteria have been developed by RWDI through research and consulting practice since 1974. They have also been widely accepted by municipal authorities, building designers, and the city planning community, including the City of Hamilton.

3.1 Pedestrian Comfort

Pedestrian comfort is associated with common wind speeds conducive to different levels of human activity. Wind conditions are considered suitable for sitting, standing, strolling or walking if the associated mean wind speeds (see table) are expected for at least four out of five days (80% of the time). The assessment considers winds occurring between 6 AM and midnight. Limited usage of outdoor spaces is anticipated in the excluded period. Speeds that exceed the criterion for Walking are categorized Uncomfortable. These criteria for wind forces represent average wind tolerance. They are sometimes subjective and regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. can also affect people's perception of the wind climate.

Comfort Category	GEM Speed (km/h)	Description (Based on seasonal compliance of 80%)
Sitting	≤ 10	Calm or light breezes desired for outdoor seating areas where one can read a paper without having it blown away
Standing	≤ 14	Gentle breezes suitable for main building entrances, bus stops, and other places where pedestrians may linger
Strolling	≤ 17	Moderate winds appropriate for window shopping and strolling along a downtown street, plaza or park
Walking	≤ 20	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 20	Strong winds considered a nuisance for all pedestrian activities. Wind mitigation is typically recommended

3.2 Pedestrian Safety

Pedestrian safety is associated with excessive Gust Speeds that can adversely affect the balance and footing of a person. These are usually infrequent events but deserve special attention due to the potential impact on pedestrian safety.

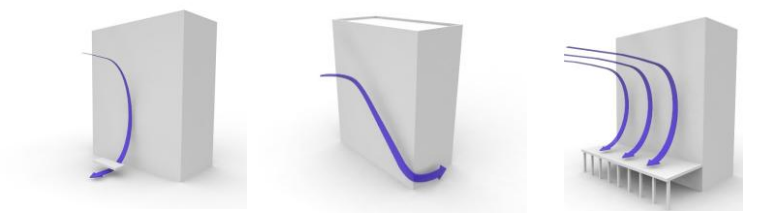
Safety Criterion	Gust Speed (km/h)	Description (Based on annual exceedance of 9 hrs or 0.1% of time)
Exceeded	> 90	Excessive gusts that can adversely affect one's balance and footing. Wind mitigation is typically required.

4. RESULTS AND DISCUSSION

4.1 Wind Flow Around Buildings

Wind generally tends to flow over buildings of uniform height, without disruption. Buildings that are taller than their surroundings will intercept and redirect winds around them. The mechanism in which winds are directed down the height of a building is called *Downwashing*. These flows subsequently move around exposed building corners, causing a localized increase in wind activity due to Corner Acceleration. Stepped massing, low roofs and canopies diffuse downwash and reduce the potential wind impact on the ground level. These flow patterns are illustrated in Image 8.

At 12 storeys, the proposed building is of a comparable height to surrounding structures. It will be flanked by a neighbouring building to the west and will also benefit from wind shielding provided by the surrounding buildings in the predominant wind directions. Therefore, the project is not expected to redirect winds significantly and cause adverse impacts on the local wind conditions.



Downwashing | Corner Acceleration | Stepped Massing and Low Roofs

Image 8: General wind flow patterns

4.2 Simulation Results

The predicted ground-level wind comfort conditions for the Existing and Proposed configurations are presented in Images 9 and 10, respectively, and results for the amenity podium on Level 6 are shown in Image 11. The results are presented as colour contours of wind speeds calculated based on the wind comfort criteria (Section 3). The contours represent wind speeds at approximately 1.5m above the local grade.

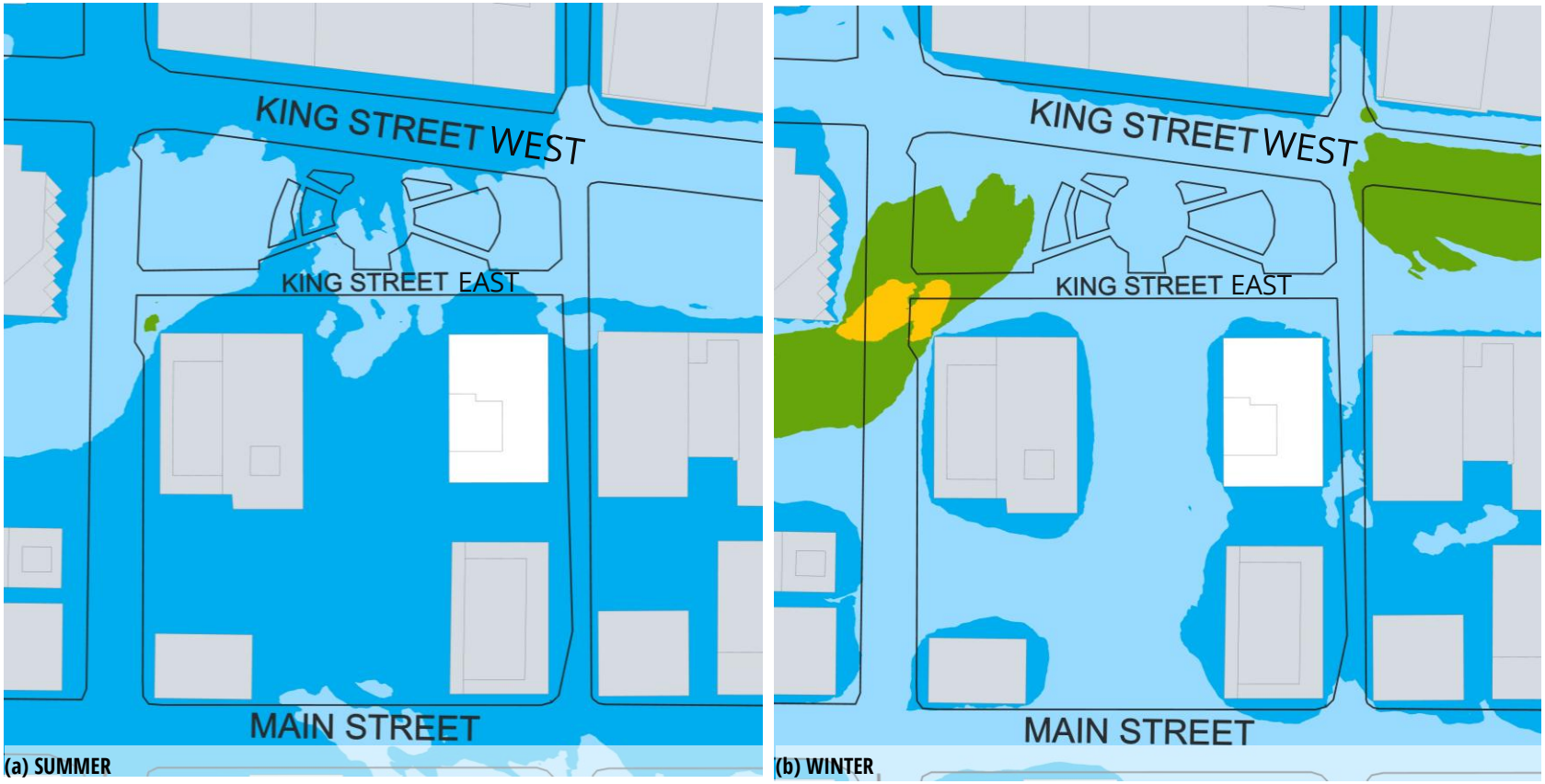
The assessment against the safety criterion (Section 3) was conducted qualitatively based on the predicted wind conditions and our extensive experience with wind-tunnel assessments for similar buildings in the City of Hamilton.

A detailed discussion of the expected wind conditions with respect to the prescribed criteria and applicability of the results follows in Section 4.3.

Target Conditions

For the current development, wind speeds comfortable for walking or strolling are appropriate for sidewalks and walkways where pedestrians are likely to be active and moving intentionally. Lower wind speeds comfortable for sitting or standing are required for entrances and areas where people are expected to be engaged in passive activities. Calm wind speeds suitable for sitting are desired in areas where prolonged periods of passive activities are anticipated, such as outdoor amenity areas, seating areas etc., especially during the summer when these areas would be typically in use.

4. RESULTS AND DISCUSSION

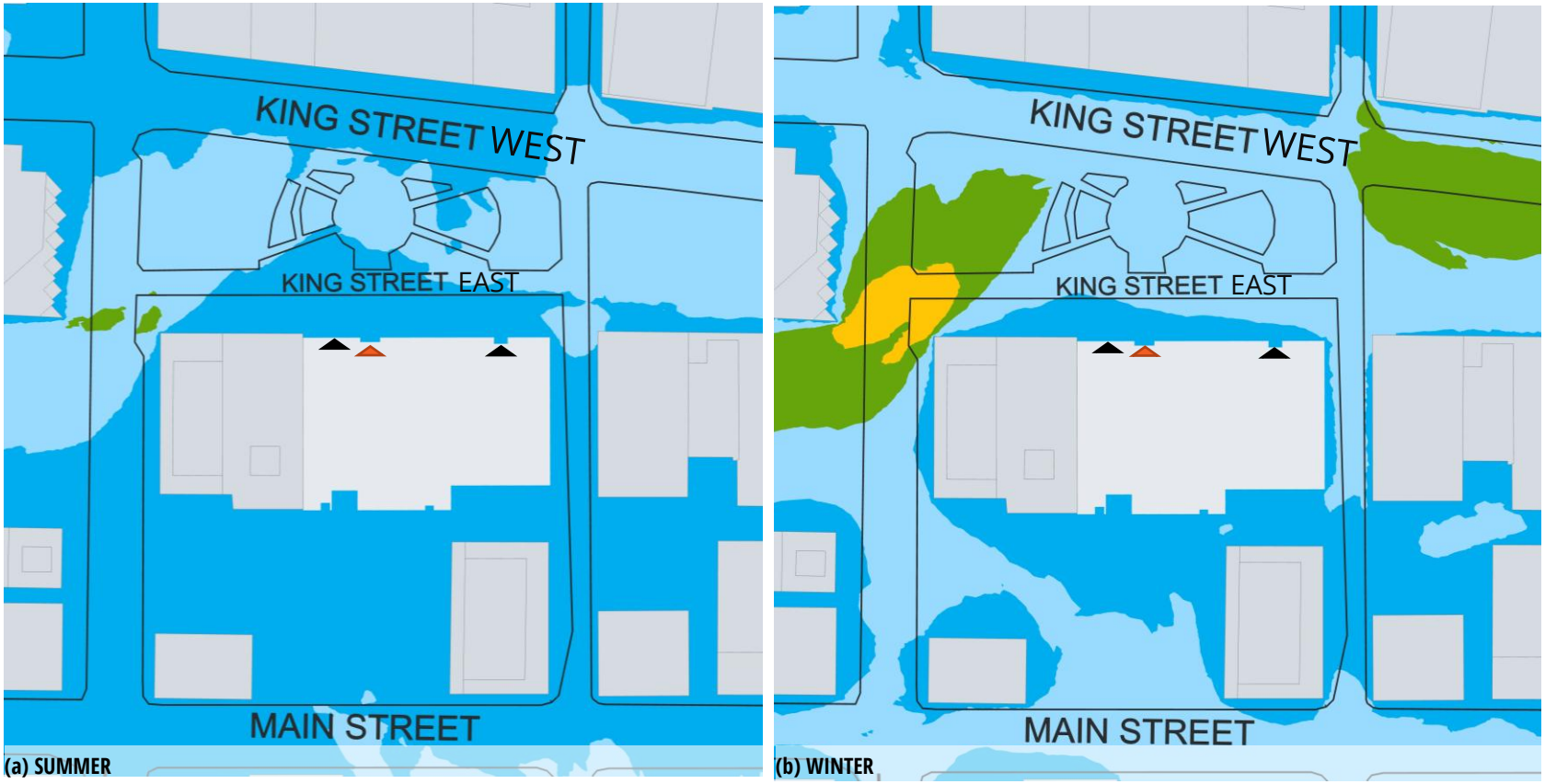


COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

SAFETY: The criterion will be met at all areas assessed

Image 9: Predicted wind conditions – GROUND LEVEL – EXISTING SCENARIO

4. RESULTS AND DISCUSSION



COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

SAFETY: The criterion will be met at all areas assessed

RESIDENTIAL ENTRANCE RETAIL ENTRANCE

Image 10: Predicted wind conditions – GROUND LEVEL – PROPOSED SCENARIO

4.3 Existing Scenario

The existing site consists of an open lot adjacent to mid-rise neighbouring buildings. Wind conditions at all areas on and around the existing site are considered comfortable for sitting or standing in the summer and winter (Image 9). Higher wind speeds, with conditions suitable for strolling or walking, are identified around the northwest corner of the neighbouring building to the west of the study site and along King Street West during the winter (green and yellow regions in Image 9b). These wind speeds are suitable for the intended use of pedestrian areas.

The pedestrian wind safety criterion is met at all areas assessed in the Existing configuration.

4.4 Proposed Scenario

4.4.1 Grade-Level

Due to the moderate height of the proposed building, its connection to the neighbouring building, and the positive design features (such as the L-shaped form and podium) the impact of the project will be largely limited to the immediate surrounding areas. Wind speeds are predicted to meet the pedestrian safety criterion at all areas on and around the site.

The resultant wind conditions across most areas of the site are expected to remain comfortable for sitting or standing throughout the year (Image 10). While slightly higher winds speeds are predicted near the northwest corner of the neighbouring building to the west, reduced wind activity is expected along the sidewalks of King Street to the north and the parking area to the south of the site. These conditions are considered appropriate for the intended use of pedestrian areas.

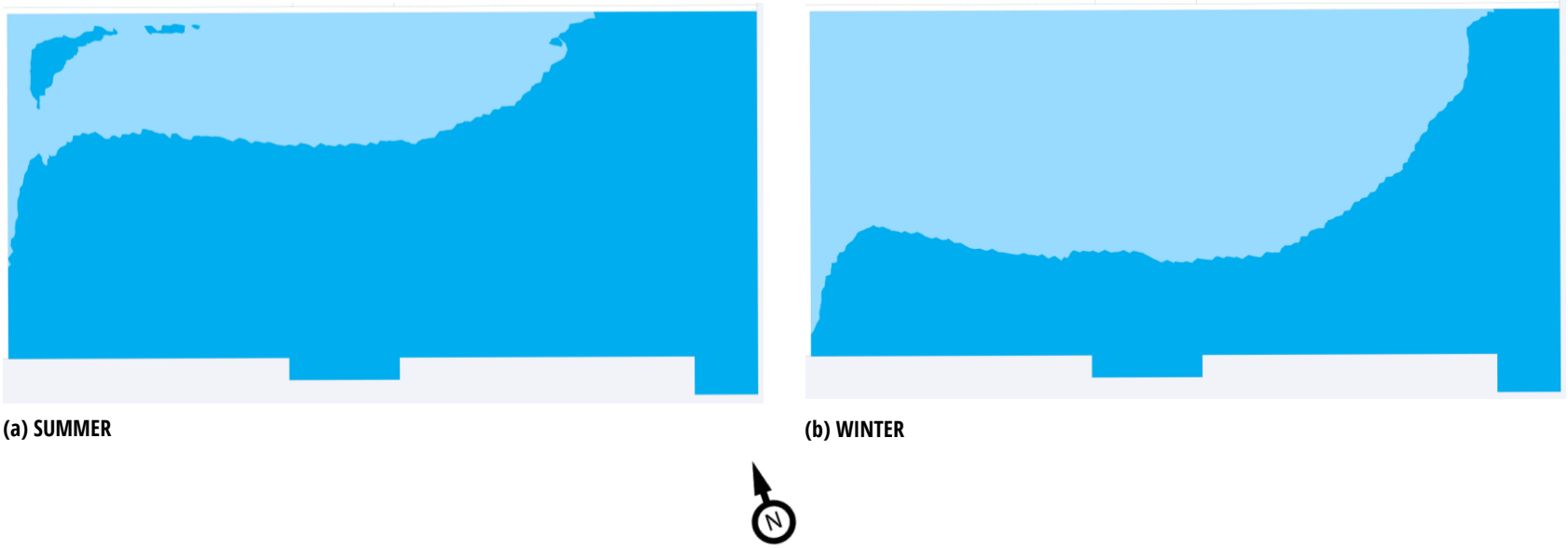
Benefited from the overall low wind activity, as well as the canopies and recessed entrance design, wind conditions near the residential and commercial entrances of the building are expected to be comfortable for sitting year-round (Image 10), which is considered ideal for the intended usage of entrances.

4.4.2 Level 6 Amenity Area

The Level 6 podium roof amenity space is situated within the sheltered area created by the L-shaped massing and is therefore expected to be protected from the prevailing winds. Wind conditions are expected to be comfortable for sitting or standing throughout the year (Image 11), which is favourable for outdoor amenity use. The safety criterion is to be met at all areas on the amenity space.

Low speeds comfortable for sitting are ideal for areas intended for seating, dining or lounging. Conditions comfortable for standing represent low speeds with occasional strong breezes; these conditions are expected in a small area to the north of the amenity in the summer and may be considered appropriate if the area is not intended to be designed as a seating area.

4. RESULTS AND DISCUSSION



(a) SUMMER

(b) WINTER

COMFORT: SITTING | STANDING | STROLLING | WALKING | UNCOMFORTABLE

SAFETY: The criterion will be met at all areas assessed

Image 11: Predicted wind conditions – LEVEL 6 AMENITY AREA – PROPOSED SCENARIO

5. SUMMARY

RWDI was retained to provide an assessment of the potential pedestrian level wind impact of the proposed Gore Park Residences development in Hamilton, Ontario. Our assessment was based on computational modelling, simulation, and analysis of wind conditions for the proposed development design, in conjunction with the local wind climate data and the RWDI wind criteria for pedestrian comfort and safety. Our findings are summarized as follows:

- Wind conditions are suitable for pedestrian use across the existing site.
- With the introduction of proposed development, wind conditions at the ground level, including all sidewalks, are expected to remain suitable for the intended use throughout the year.
- Wind conditions near the residential and retail entrances are expected to be comfortable for the intended pedestrian use.
- Wind conditions on the Level 6 amenity area are expected to be mostly comfortable for passive use throughout the year.
- Wind speeds at all areas assessed are expected to meet the pedestrian safety criterion in both the Existing and Proposed configurations.

6. DESIGN ASSUMPTIONS

The findings/recommendations in this report are based on the building geometry and architectural drawings communicated to RWDI in June 2026, listed below. Should the details of the proposed design and/or geometry of the building change significantly, results may vary.

File Name	File Type	Date Received (mm/dd/yyyy)
23019	Revit	06/15/2026

Changes to the Design or Environment

It should be noted that wind comfort is subjective and can be sensitive to changes in building design and operation that are possible during the life of a building. These could be, for example: outdoor programming, operation of doors, elevators, and shafts pressurizing the tower, changes in furniture layout, etc. In the event of changes to the design, construction, or operation of the building in the future, RWDI could provide an assessment of their impact on the discussions included in this report. It is the responsibility of Others to contact RWDI to initiate this process.

7. STATEMENT OF LIMITATIONS

This report was prepared by Rowan Williams Davies & Irwin Inc. for Ninco Developments ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein and authorized scope. The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

7. REFERENCES

1. H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.

2. H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.

3. C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.